NASA GODDARD SPACE FLIGHT CENTER
EDUCATION PROGRAMS
CODE 130.3
FREE GRANT FINAL REPORT

Description of Work Accomplished during the First Year

During the first year our goals of finalizing a series of 60 Earth and space sciences modules on the Internet, the development of an electronic feedback system whereby teachers using the materials could provide input for improvement, and a series of training workshops on the materials were accomplished. These science investigations are available on the web at: http://education.gsfc.nasa.gov.

Details of What We Did

Goddard Space Flight Center Education Programs in conjunction with a minimum of 20 Earth and space science teachers developed an Internet-based structure for Earth and Space System Science instructional investigations that incorporate NASA data and education materials and products. We established a standardized format, made the investigations available electronically, and provided access to teachers on a national basis.

Additionally, teachers expanded the repository with a new set of investigations developed to meet voids in content areas identified by teachers. Particular focus was on developing investigations to incorporate data available via the Earth Observing System Platform, and the Sun Earth Connections Space Science National Forum. Nationwide advertising for pilot volunteers was conducted. A dynamic website for piloting developed investigations was completed.

In order to ensure that our pilot of investigations was worthwhile, a pilot testing design was developed with the assistance of the former director of the Center for Education Research and Development at the University of Maryland, Baltimore County. This model identified that we should collect 25-30 evaluations per investigation to determine usability and needed modifications for each investigation.

Three specific partnerships were undertaken as a result of the grant funds.

1. We created a strong partnership with a local school district whereby the materials developed would be utilized within a district wide Earth system science course of study which began implementation in five high schools in September 2000 and resulted in training for 26 teachers (22 regular education teachers, 2 special education teachers, 2 teachers of gifted and talented students) and 2 technology specialists. GSFC provided support through workshops for each of these teachers during two 2-week workshops in the summer and continued support throughout the school year, including e-mail interaction, a website, listserv, and workshop training during the school year. The full agenda can be found at: http://edmall.gsfc.nasa.gov/aacps/academy/index.html.

2. We created a relationship with the Maryland State Department of Education School Library Division and Science area of the Division of Instruction, the Maryland Business Roundtable, and Maryland Tech Corps. The direct results of this partnership were five regional workshops for school library media teachers related to the Internet investigations and Maryland School Performance Program Science Test results, and a workshop for 3 days in the summer that brought in building-level teams of school library and science teachers to develop plans for working together during the 2000-2001 school year. The full agenda is contained in Attachment 1.

3. We created a partnership with the nine superintendents of schools on the Eastern Shore of Maryland through the Eastern Shore Superintendents Consortium to design an Earth system and space science course of study. The program was held for 3 days in Easton, Maryland and involved 19 teachers. The full agenda is found at: http://edmall.gsfc.nasa.gov/aacps/agenda.html.

4. In summary the project goals that were established and accomplished through these three partnerships were:

- To develop and implement an investigation model by which NASA's Goddard Earth and Space Science resources available on the World Wide Web can be incorporated by classroom teachers into viable classroom activities related to National Standards in Science, Mathematics, Geography, and Technology.
- To complete the investigation model as a model for developing interactive Internet investigations for use in classrooms and school projects without destroying the individual teacher's creativity through "cookie cutter" models.
- To use the Internet as a major communication vehicle for the dissemination of, and feedback on, Earth and Space Science curricular support materials to Earth and Space Science teachers primarily at the secondary level.
- To develop a resource bank of Earth and Space Science activities using Internet Websites linked to the resources of the Earth and Space Science directorates at NASA's Goddard.
- To correlate the instructional resource bank with National Standards for Earth and Space Sciences.
- To develop an evaluation schema for the model that focuses on instructional impact on learning.
- To foster relationships with NASA Earth Science and Space Science projects and missions to cooperatively develop Internet interactive instructional materials for learners in grades 5-12 using live and historical data of current, state of the art NASA science.

How We Accomplished Our Goals

Since a major part of the work was the development of web-based science investigations and given the large number of teachers and scientists being engaged in small groups, it became important to establish standards for investigations. Those standards resulted in the identification of a series of Education elements and parameters governing creation of the investigations. All of these elements have been reviewed for consistency with the USDOE GEM Project descriptors.

Elements of Investigations:

The Concept: The concept of the investigation underlies the selection of phenomena, data, background information and outcomes. It unifies the procedures and is the final object and target of the student's understanding. The concept should be clearly stated, scientifically accurate, meaningful, and significant in terms of national, state, and local standards.
Title: This will be a brief descriptive statement. The learner will be able to ascertain the general nature of the investigation from the title.
Abstract: This should be a direct statement of the investigation, including a brief synopsis of the topic, outcomes and significance of the investigation. Teachers and students should be able to make an informed decision about doing the investigation based on the abstract.
Objectives: The outcomes of an investigation state the desired products of the student's research activities, including: understandings, interpretations, analyses, graphs, images, animations, essays, and other items generated by the student researcher. The objectives, or outcomes, of the investigation should make sense to the student, and be clearly stated, achievable within designated time, relevant to the concept.
Background Information: This information should enable the interested novice to engage in the concept of the investigation and provide the student with the necessary terms, tools, etc., to understand and interpret the data and outcomes of the research. The background information should be clearly expressed in non-technical language, requiring little prior knowledge; explain all key terms and concepts; be comprehensive relative to the case and context of the investigation; explain the significance of the case and context of the investigation.
Procedures: Procedures should be clear, achievable, and enable the student to fulfill the objectives of the investigation. Each step should contain a single achievable goal, and the whole process of steps should be comprehensible, coherent, and achievable.

Identifiers: Identifiers, or coding, facilitate the searchability of the investigations by grade level, content keyword, and other selected characteristics are complete. Each investigation has been coded so that it can be located by content, grade level, behavior, National Mathematics Standard, National Science Standard, and National Geography Standard, if applicable.
Materials: The complete list of materials required for doing the investigation is identified.
Resources: This section not only lists, but also supplies the investigator with resources for doing the investigation, including software, extended background information, bibliographies, contact information.
Extensions: This section describes the next step in deepening or broadening the investigations at hand.
Credits: Lists the authors, the science advisors, editor, and responsible parties and programs, including contact information.
Printable materials: These materials include worksheets, checklists, and templates for collecting and summarizing data, information, and findings. These materials should be appropriately formatted for print media.

The Ambassadors, who are teachers who have worked within the program for a period of 5 years, worked in teams of two. Teams were assigned to NASA missions and projects that have indicated a desire to work with educators in developing educational products utilizing the science content and data from their projects. This collaboration between scientists and educators resulted in minimizing the problems of identifying appropriate topics for investigations and finding data formats user-friendly enough to be used with hardware and software available in school systems and by learners in grades 5-12. A more efficient and beneficial use of time and effort resulted from this collaboration. Instead of each Ambassador providing his/her own equipment, computers were rented and a template was provided to guide the teams in the presentation of their investigations. This consistency in equipment, software, and format greatly aided the programmers who were responsible for converting the investigations into HTML format and uploading them to the pilot-testing site. All investigations that met the criteria of the pilot design have been placed on the Website and have been made available to all teachers. A complete listing of the investigations can be found at the following Website: http://education.gsfc.nasa.gov.

Parameters for Investigations:

- Use data (preferably real-time rather than historical) from two or more of Earth's systems (Biosphere, Atmosphere, Hydrosphere, Lithosphere) to study their interaction in an area of Earth System Science, and data from space science instruments, such as SOHO and the Hubble Space Telescope.
- Involve the use of Internet resources.
- Support content in current school programs in the Earth and space sciences.
- Are not standard investigations found in textbooks.
- Are based on content in Earth system science as detailed in the Earth Science Enterprise Program, the Space Science content detailed in the Office of Space Science Education Plan, and related NASA missions and projects.
- Have a measurable outcome.
- Support the standards detailed in the National Standards for Science Education, AAAS Project 2061, the National Standards for Mathematics Education, the National Geography Standards, and the Maryland Core Learning Goals.
- Are appropriate science learning investigations for students in grades 5-8 or 9-12.
- Are useful to adults wishing to enhance their understanding of Earth System Science and Space Science or parents wishing to help their children gain knowledge in this area.
- Integrate science, mathematics, geography, and technology areas with other school curriculum areas.

Finally, metadata records for each of the modules were provided using the GATEWAY to EDUCATIONAL MATERIALS (GEM).

Our next activity was to identify the teachers who would assist us in module development and finalization and to identify content that was needed. This task was accomplished by working with NASA Earth System Science enterprise and Space Science enterprise to identify a working definition of Earth System and Space Sciences that related to Earth science school curriculum at the high school level.

To accomplish this definition phase we incorporated the volunteer school district science supervisor, assigned one full time education programs staff member, and solicited the services of some 12 renowned Earth and space scientists. This phase was important because it allowed us to work from the real world definition of science acceptable to scientists rather than rely totally on educators to define the content of the fields of science in question.

A copy of the resulting definition is found in Attachment 2.

Our next step was then to define the major concepts that relate to the definition. The definition identified five spheres of Earth science and one sphere of space science. It then became necessary to identify major concepts within each sphere and to show the interrelationships of the spheres to each other. That product is found at http://edmall.gsfc.nasa.gov/concept_maps.pdf.

SPECIFIC SCHOOL BASED ACTIVITIES RELATED TO THE SCIENCE

1. ANNE ARUNDEL COUNTY SCHOOL SYSTEM EARTH SYSTEM AND SPACE SCIENCE PROJECT

Since the definition must find meaning in a school context it then became important to link the sphere concepts to curriculum standards. Educators familiar with both Earth and space science content and the standards at both national and state levels accomplished this task. This was accomplished by teaming with Anne Arundel County Public Schools science supervisor in order to develop an Earth and Space System science course of study in response to Maryland State Department of Education plans to develop a graduation testing program in science.

Finally, it was important for school personnel to take that information and put it in the context of a course of study. This happened by having the science supervisor for the school district work with 16 teachers to develop a 155-day course of study. That document is found at: http://edmall.gsfc.nasa.gov/aacps.

It then became important to train the actual classroom teachers who would be implementing the course of study during the 2000-2001 school year. A copy of the agendas for the 2-week training program is found at: http://edmall.gsfc.nasa.gov/aacps/academy/index.html. In order to view the agenda, click on the date.

2. SCHOOL LIBRARY MEDIA AND SCIENCE TEACHER WORKSHOPS

A second effort with the materials was to work with the Maryland State Department of Education and the Maryland Business Roundtable in a partnership with Maryland Tech Corps to develop and conduct a training program in Maryland in five regional locations, followed by a 3-day workshop in the summer of 2000. An agenda for these programs is contained in Attachment 1.

The focus of this effort was to train school library media and science teachers on the NASA investigations so that they can work as a building level team to review their Maryland School Performance Science Test Results and identify NASA materials that meet their needs in low performing areas based upon subscores in science. A technology support system was also provided through Maryland Tech Corps so that teachers would have access to human assistance since the program was computer based.

3. Eastern Shore of Maryland Superintendents' Consortium

This effort was directly related to working with teachers from the nine Eastern Shore of Maryland county school districts. As a result of discussions with the local superintendents a workshop was conducted to provide training to teachers on the Earth and space system science material. The workshop was 3 days. (Agenda is found at: http://edmall.gsfc.nasa.gov/aacps/agenda.html .)

4. Other Programs Not Funded through the Consortium

In addition to the significant depth work with the single school district, the modules were also presented to 40 teachers from the State of Maine, and discussions are occurring to implement a similar program with the Maine Mathematics and Science. This Alliance is the official body under the auspices of Francis Eberle, responsible to the Commissioner of Education for improving mathematics and science learning in Maine schools.

The materials were also presented to approximately 35 teachers from Chicago, Illinois who attended a 1-week workshop at Goddard.

PILOT OF MATERIALS

The 155-day curriculum is currently being implemented on a pilot basis in five high schools within the Anne Arundel County Public School System. Teachers and the science supervisor and NASA scientists and educators will be meeting at least 4-full days during the school year. Additionally, a Listserv by which teachers and scientists and educators can communicate has been established. A NASA civil servant experienced in training with the Office of Human Resources is assigned to a 120-day detail in order to develop a support system for classroom teachers as an integral part of the implementation of the course of study. Two of the five high schools are operating under a four-period day structure and the remaining three are operating under the more traditional year long course of study, so we will be gathering data about support system needs when the instructional time frame is varied.

School Library Media Project staff will be meeting in October 2000 in order to determine next steps on the actual conducting of training on materials based upon review of science performance.

The Eastern Shore Consortium has scheduled meetings with its science supervisors to determine the process by which an Earth system and space science course of study will be developed to serve the nine Shore counties. Those meetings are being coordinated through Mr. William Storage of the Eastern Shore Staff Development Center.

CURRENT STATUS

The course of study is now underway in five high schools. Professional development days have been identified. A copy of the October 5, 2000, agenda is contained in Attachment 3.

Teachers were asked to evaluate the program and their comments related to the training and moving forward are contained in Attachment 4. All comments are the teachers own words and followed by a letter from the science supervisor regarding the value of the program.

PLANS FOR NEXT STEPS

Next steps include:

Providing support to the teachers in the five high schools who are currently teaching the course, including the design of a support system.

Providing interactions among the other teachers who attended the training but are not teaching the course of study during this school year but are expected to next year.

Designing next summer's training program for new teachers who will be teaching the course of study beginning in September 2001.

Building enhancements to the program of study through the use of NASA data, satellite imagery, and tools for communicating via technology across schools and classrooms.

Designing activities that will engage students beyond the actual classroom period of instruction.
Exporting the models for modules, training workshops, and support systems to a consortium of nine county school districts on the Eastern Shore of Maryland.

Exporting the models to the State of Maine through the Maine Mathematics and Science Alliance.

Presentation of the models at the 2001 national meeting of the American Geophysical Union (AGU).

Discussions with National Geographic regarding partnerships to sustain the effort.

LESSONS LEARNED

A number of lessons were learned through the first year of development including:

BUILD IT AND THEY WILL COME WORKS FOR SURFING BUT NOT FOR INTENTIONAL LEARNING. This popular mythology appears to be just that. Development of curriculum support materials, even if developed by teachers, does not mean that those materials will find their way into the classroom, even if teachers are doing the development. It is essential that a market for the products be identified before development begins and that market must include more than classroom teachers, but also content area supervisors.

TEACHER INVOLVEMENT DOES NOT EQUAL QUALITY PRODUCTS. This mythology assumes that if a teacher develops materials they are ready for classroom use. This mythology demonstrates the problem of curriculum and instructional design skill being attributed to practitioners. While this may be true, it is not automatically so.

CURRICULUM DEVELOPMENT IS NOT SUFFICIENT. This mythology probably accounts for why so much excellent curriculum material sits on shelves unused. Teachers need instructional design assistance in order to implement the curriculum, and this design must take into account how much time is devoted to particular concepts in the routine of a 180 day school year, and how activities and hands-on approaches can fit into that instructional program. The add-on phenomenon is a major obstacle to implementation. If we add to instruction, we must also identify what is being removed or adjusted.

THE VARIABLE OF TIME CONTINUES TO BE A MAJOR ISSUE. Teachers are willing to work on activities but not after a full day's work. Very little time is actually available for significant training and skill practice, and even less time for team-release time so teachers can help each other.

MONEY IS NOT THE ANSWER. While necessary, money is not sufficient. Making an assumption that providing funds for substitute teachers thereby increases professional development time appears to be a mistake, not only because of public reaction to substitutes, but also because school districts are encountering difficulty locating qualified substitutes who can affect learning while the teacher is out of the classroom.

TECHNOLOGY IS NOT AS AVAILABLE AS STUDIES PURPORT. Schools may have computers, but issues of firewalls, networks or the lack thereof, labs rather than classroom distributed, teachers lack of access to portable computers, quality of connectivity—all serve to make materials that are image and data intensive very difficult to use in a school environment.

TIMING IS EVERYTHING. It does very little good to ignore timelines for the development of district level professional development calendars, and teacher planning structures. Once the school year has started major adjustments are not likely to occur, so the window of opportunity to impacting instruction in a given school year is rather narrow.

SUSTAINABILITY IS DETERMINED BY PARTNERSHIPS. Excellent education products and activities can be made available to teachers, but training is an essential aspect of the distribution process. Thus, any single agency or corporation seeking to deploy an education product will need to have strong partnerships to offer necessary training with a large number of schools and faculty in order to successfully deploy the material.

BUDGET EXPENDITURES BY CATEGORY	FREE FUNDS	OTHER SOURCES	INKIND
Activity 1: Earth System Science Curriculum			
Workshop supplies	103		
Computer rental	6,000		
Teacher stipends	19,292	19,500	
Teacher interns	4,205	10,334	
Teacher Administrator for Program		5,783	
Evaluation and Program Design		4,400	
Personnel			150,000
Materials			10,000
SUBTOTAL	**23,600**	**46,017**	**160,000**
Activity 2: School Library Media			
Teacher Stipends	9,000		
Teacher Lodging	6,400		
MBRT Management		12,730	
Professional Development		5,000	
Workshop Supplies		2,300	
Pre-planning workshop expenses		3,000	
Personnel (Principal)		7,000	25,000
Materials			3,000
SUBTOTAL	**15,540**	**30,030**	**28,000**
Activity 3: Eastern Shore Consortium of Maryland			
Per Diem expenses for 22 teachers for 3 day summer workshop and followup	8,662		
Stipends and Social Security	2,235		
Administrative fees	103		
Computer Equipment for teachers		30,000	
Personnel			7,000
Materials			2,000
SUBTOTAL	**11,000**	**30,000**	**9,000**
GRAND TOTAL	**50,000**	**106,047**	**197,000**

ATTACHMENT 1

SCHOOL IMPROVEMENT WEBSITE TRAINING AND BEYOND
AGENDA

Tuesday, August 1, 2000

9:00	**Coffee**
9:30	**Welcome and Introductions**
9:45	**Overview** • **Vision & Background of the Project** • **Project Outcomes** • **Agenda**
10:00	**Team Building**
10:30	***Information Power*** **- Partnerships for Teaching**
10:45	**School Improvement Website** • **Review Site** • **Provide Update** • **Conduct Needs Assessment**
12:00	**LUNCH**
1:00	**Science Resources** • **NASA's Student Investigations** • **Resource Library** **(Overview of NASA's Resources in large group. Research in small groups to select and evaluate appropriate resources to use in developing lessons/unit.)**
2:00	**Team Work** • **Determine Desired Lesson/Unit Outcomes** • **Outline Scope of Work According to a Template**
4:00	**Check-In Holiday Inn**
6:00	**Dinner & the 5 E Model**

ATTACHMENT 1 CONTINUED

SCHOOL IMPROVEMENT WEBSITE TRAINING AND BEYOND
AGENDA

Wednesday, August 2, 2000

9:00	**Coffee**
	Science Resources Continued • **Student Investigations** • **Consultations with the Experts** • **Resource Library**
	(Break Built-In)
11:00	**More Resources with MCI WorldCom's Marco Polo**
12:00	**LUNCH**
1:00	**Team Work Continued** • **Lesson/Unit Plan Development**
2:00	**MD TechCorps** • **More Help Is On the Way!**
	Team Work Continued **(Built-in Break)** • **Lesson/Unit Plan Development**
6:00	**Dinner (On Your Own)**
7:00	**Work Session in the Lab**

SCHOOL IMPROVEMENT WEBSITE TRAINING AND BEYOND
AGENDA

Thursday, August 3, 2000

9:00	**Coffee**
	Team Work Continued • **Lesson/Unit Plan Development**
	(Break Built-In)
12:00	**LUNCH**
1:00	**Group Sharing of Projects and/or Plans**
2:00	**Summary & Evaluation** • **Recap expectations for follow-up** • **Evaluate Workshop**
3:00	**Adjourn**

ATTACHMENT 2

Earth System Science

The objective of Earth System Science is to understand how the Earth is changing and the consequences for life on Earth with a focus on enabling prediction and mitigation of undesirable consequences. This requires an identification and description of how the Earth system is changing, the ability to identify and measure the primary forcings on the Earth system from both natural and human activities, knowledge of how the Earth system responds to changes in these forcings, identification of the consequences of these changes for human civilization, and finally, the ability to accurately predict future changes with sufficient advanced notice to mitigate the predicted effects.

To achieve this level of knowledge and understanding a multidisciplinary approach to studying Earth as a system is needed. Such an approach involves studying the processes and interactions (cycles) among the atmosphere, hydrosphere, cryosphere, biosphere, and geosphere from a global to local point-of-view, and across the time scales (minutes to eons) in which these spheres interact. It requires the use of physical and chemical laws with mathematics to describe the physical, chemical and biological processes within each sphere and the interactions between the spheres. These descriptions are used along with observations from ground, airborne, waterborne, and spaceborne instruments to construct models through which complex interactions of the spheres are studied. It is through the understanding of these complex interactions that accurate, predictive models are developed.

(Dr. Blanche Meeson, Assistant Director of Earth Sciences for Education and Outreach, Goddard Space Flight Center, May, 2000.)

ATTACHMENT 3

Goddard Space Flight Center Education Programs
Anne Arundel County Public Schools
Earth and Space Systems Science Workshop

The Sun – Earth System
October 5, 2000
Building 28, Room E210

8:30-8:45 **Welcome & Introductions** *Shelli Slutskin, Science Coordinator, Anne Arundel County Public Schools*

8:45-9:30 **Presentation: National Solar Day.** April 27, 2001 is National Solar Day. This session will provide an overview of opportunities for teachers to involve students in Sun-Earth Connection science. The CD, Sun-Earth Connection: A New Perspective, will be previewed and distributed to each participant.
Elaine Lewis, SECEF Education Specialist, Code 630
Troy Cline, SECEF Education Specialist, Code 630

9:30-10:15 **Content presentation: "Inside Our Star, the Sun".** This presentation will provide information about the structure and processes of the sun and how scientists use satellite data to study the sun.
Therese Kucera, Project Scientist, Code 682.3

10:15 **Break**

10:30-11:15 **Content presentation: "Space Weather"**
Paul, *Project Scientist, Code 696*

Activity: "Follow the Sun – Tracking and Predicting Space Weather from Your Own Classroom." Most of the data that scientists use to track space weather events is available on the World Wide Web. Using case studies of past events, and real-time imagery and data from current events, students can do much of the same charting, graphing, plotting, and predicting work that scientists do.

11:15-12:00 **Content Presentation: "Solar Storms and You."** A survey of a new education activity book that covers solar activity, storms, and their terrestrial impact. The use of a homemade magnetometer will be featured.
Dr. Sten Odenwald, Code 633, Space Science Data Operations Office, IMAGE Education and Public Outreach Manager

12:00 **Lunch (catered)**

12:30-1:15 **Activity: The** Radio JOVE project provides a hands-on learning experience in solar and planetary radio astronomy. A relatively inexpensive kit will demonstrated that allows schools to construct a working radio telescope for observing Jupiter and the Sun.
Dr. James Thieman, Code 633

1:15-2:30 **Activity:** Homemade Magnetometers and Experiments with Magnetism. Participants will learn how to construct a magnetometer, which can be used to measure fluctuations in the Earth's magnetic field caused by the solar activity. Various uses for the magnetometer will be presented.
Ed Eckel and Matt Friel, Science Teachers, Georgetown High School

ATTACHMENT 4

NASA EDUCATION PROGRAMS
GODDARD SPACE FLIGHT CENTER
EARTH AND SPACE SYSTEM SCIENCE CURRICULUM DEVELOPMENT FOR HIGH SCHOOL
SHORT PARTICIPANT FEEDBACK
SUMMARY REPORT
FROM 01-JUL-2000 TO 01-AUG-2000
(FY2000)

Number of Participant Reports Entered: 26

Program Titles:

Earth and Space System Science Curriculum Development for High School

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PROGRAM CONTENT:

Which of the following topic areas were addressed in your program?

Topic	Number	Percentage*
Science	25	100
Mathematics	6	24
Engineering	1	4
Technology	19	76
Other	3	12
Nothing Selected	**1**	**3.85**

*** Percents are calculated based on the number of participants responding to this question. The percent for "Nothing Selected" is based on the total number of participant reports. Please note that percentages can add up to more than 100% as participants can select multiple options.**

PROGRAM VALUE:

Statement	Average Rating	No Answer
This program was a valuable experience:	4.9	1
The content of this program matched your school's or school system's educational objectives:	4.8	11
This program helped you better understand careers in science, mathematics and technology:	4.6	12

Average rating is based on the following score:

5=Strongly Agree 4=Agree 3=Neutral 2=Disagree 1=Strongly Disagree 0=No Rating Checked

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PRESENTATION:

Statement	Average Rating	No Answer The
The presenter was well organized:	4.9	2
The presenter made good rapport with the audience:	4.7	12
The presenter stayed on the task:	4.8	1
Overall, I was satisfied with the job done by the presenter:	4.9	1
I was satisfied with the overall quality of the presentation:	4.9	1
Visuals and demonstrations enhanced the interest of the presentation:	4.8	12

Average rating is based on the following score:

5=Strongly Agree 4=Agree 3=Neutral 2=Disagree 1=Strongly Disagree 0=No Rating Checked

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COMMENTS REPORT
FROM 01-JUL-2000 TO 01-AUG-2000
(FY2000)

COMMENTS/SUGGESTIONS:

*None Very good course. I was glad to have the course at Goddard Space Center.
*This program was an excellent introduction to our curriculum. The scientists that spoke to us each morning shed insight on some difficult subjects.
*Great job!
*The various scientists that came to share their expertise with us were invaluable. I found them informative and extremely helpful.
*In my personal opinion, the summer earth/space academy at Goddard was the most rewarding educational experience I have had in all of my professional years of teaching.
*While impressed with all of the speakers and their presentations, I must admit to being particularly charmed by Dr. Berg's presentation integrating history, science, aspects of literature, etc. A whole program based on this integrative approach would be of immense value. As usual, we needed to do too much in too short a period, and could not stop a savor particularly tasty bits. But that's the nature of the beast. A very worthwhile, stimulating, and satisfying program. Barry Foy
*Personal interest - I would like more info on the ongoing research done by the scientist/presenters. They did a lot to make this workshop relevant and positive.
*The curriculum needs to have a materials list as a separate addendum. It would be really helpful if a chart was created to cross reference all URLs and the general topics they cover. In addition it would be helpful to create a CD-ROM with all active URLs or have them listed on your Website by sphere. This would make it easier to browse ahead without having to carry the printed curriculum home each night
*I enjoyed this program. The materials and information was intended to prepare me for the following ESSS program that will be required in the near future and it did. thank you.

*All of the ambassadors of this program, specifically Mr. Greg Helms was extremely helpful. I did however, not enjoy the incredible pace through the curriculum and the almost expected assumption for the participants to stay until 4pm. If this were to be the known situation from the beginning the participants should be offered the 25.00/hour contract agreement until 4pm. The scientist speakers were excellent!! Overall I learned a lot and enjoyed the experience.
*I really enjoyed the training seminar. I thought that it was really effective to have the various scientists lecture on their area of expertise. This allowed me to gain some understanding of the "science that is being done" by the scientist's.
*John, along with the presenters, did an excellent job; really quite impressive. I was most happy being a participant - - the way in which I was treated, the materials received, the people I worked with, the info I learned, etc. I do believe, however, that the ambassadors should have taken a more active, not passive role. I believe they should have had to go over a lesson with us (each one of them) the way John did with the earthquake lesson. I know they were available on a daily basis to us, but I saw them doing very little.
*More of Dr. Loman-
*The scientist presentations were excellent and very informative. I truly enjoy listening to people who are immersed in a particular science!!
*Excellent presenters and materials. Presenters were very helpful.
*This was an excellent academy. All of the information and presentations were of great quality and value.
*This program is incredible. The scientists that came in for presentations were highly interesting and would make great guest speakers at our schools.
*Excellent program!!! Very impressed with the professional atmosphere throughout the session. Even though I am not a teacher, the experience will help me show my colleagues how to help the teachers use the technology to take advantage of this fantastic opportunity.
*The workshop was very helpful. The presentations by the scientists were fantastic. I appreciated the fact that they accepted us as part of the science team and were willing to work with us. The treated us as professionals like themselves. Someday the leadership at the Board of Education may do the same.

ATTACHMENT 5

September 8, 2000

Dr. Robert E. Gabrys
Education Officer
Office of Public Affairs
Code 130.3
Greenbelt, MD 20771

Dear Dr. Gabrys,

I cannot begin to thank you for the substantial, ongoing, and perhaps unprecedented support you have provided to me as Coordinator of Science for Anne Arundel County Public schools.

When I first approached you about 18 months ago with my need for a partnership with the Science community for the purpose of writing an Earth/Space Science High School Curriculum, you immediately rolled up your sleeves and set about providing resources and opportunities for our teachers. Your encouragement, collaboration, expertise, and vision has enhanced and enriched the program we are now able to provide for our students.

Our collaboration has sparked so many initiatives that I feel I need to create a "systems diagram" in order to organize and view each of them.

- You were kind enough to introduce me to Dr. Blanche Meeson, Assistant Director of Earth Science for Education and Outreach. Dr. Meeson has since become a member of my Science Advisory Board and additionally, has had an ongoing role in providing content update and review for our Earth/Space Systems Science curriculum project.

- You created a position for a "teacher-on loan" and hired Mr. John Entwistle to work specifically with our project. John has been an asset to our project, assisting with administrative and logistical tasks.

- Thanks to your partnership, we were able to offer our teachers a dynamic and motivating summer academy experience with morning content update

sessions by Goddard scientists and afternoon curriculum services facilitated by Goddard teacher ambassadors.

The outcome of our collaboration is a dynamic, technologically based, cutting edge Earth/Space Systems Science curriculum. Additionally, I feel confident our curriculum will prepare our high school students for the anticipated state test in Earth/Space Science.

Your willingness to be our partner and your vision of on-going support is most sincerely appreciated. On behalf of the students and teachers of Anne Arundel County Public Schools, thank you for you generosity in spirit and in deed.

Most sincerely yours,

Rochelle Slutskin
Science Coordinator

cc: Dr. Parham, Mrs. Mann, Mrs. Stack
Ms. Ross, Dr. Meeson, Mr. Entwistle

RS/db